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The Impact of Education Finance Reform on Student Achievement in Massachusetts

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It's Elementary

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In a recent article in the *Journal of Education Finance*, Phuong Nguyen-Hoang and I investigate the impact of education finance reform on student achievement in Massachusetts.[1]

Massachusetts is a good place to look for this type of impact because the state passed a major education finance reform, the Massachusetts Education Reform Act (MERA), in June 1993. MERA created a new state education aid program, Chapter 70, with a new aid formula. Moreover, both the level and the distribution of state aid across school districts changed substantially over the next several years. To be specific, Chapter 70 aid more than doubled in real terms between 1994 and 2010, and the aid formula gradually redistributed aid toward the neediest districts. MERA was passed in response to a 1993 decision by the Massachusetts Supreme Judicial Court in the case of *McDuffy v. Robertson*. This decision found that the existing education finance system was unconstitutional.

Almost all the school districts in Massachusetts are either regular or regional school districts. Regular districts coincide with a municipality, whereas regional districts cover two or more municipalities with a shared administration. Districts of both types vary in the grades they cover, K-6, 6-12, or K-12. Massachusetts is also one of the few states in which almost all school districts are fiscally dependent on a parent government. Voters in a district elect a school committee, which is responsible for regulating student attendance, setting curricula, hiring and firing teachers, and other administrative matters. However, municipal governments are responsible for financing school services. Moreover, each municipal government is required to provide, with the help of state aid, at least a minimum amount of local funding, which is inversely related to its property values. Local school funding in Massachusetts comes largely from the property tax. Thanks to Proposition 2 ½, which was passed in 1982, the property tax rate and the property tax levy increase are both capped at 2 ½ percent, although a supermajority of voters can override these provisions.

To determine the impact of MERA on student achievement, we estimated cost/efficiency and demand models using data on school districts in Massachusetts from 2001 to 2006. This column is not the place for a detailed description of these models or of our results. Suffice it to say that these types of models are well known, have worked well in explaining education finance

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[1] Phuong Nguyen-Hoang and John Yinger, "Education Finance Reform, Local Behavior, and Student Performance in Massachusetts," *Journal of Education Finance* 39 (4) (Spring 2014), pp. 297-322. This column draws heavily on this article.

in other states, and work well in Massachusetts.[2]

Our cost estimates indicate, for example, that a one-percentage-point increase in the share of low-income students requires a 1.1 percent rise in the district's per pupil spending to maintain any given level of student performance. We also find evidence of economies to pupil scale; except in the case of Boston, which is the state's largest district, larger districts have lower costs per pupil.[3]

Our demand estimates imply that the income elasticity of demand for student performance is 0.13, which is similar to estimates from other states. Moreover, we find that the price elasticity of demand for student performance is -0.52, which indicates that in Massachusetts, as in other states, voters demand better education in districts in which residential property bears a smaller share of the tax burden. Overall, the dependent status of school districts in Massachusetts does not appear to have a substantial impact on the translation of voter demands into school outcomes.

Finally, we tackle the difficult issue of inefficiency, defined as spending beyond the amount needed to reach a given performance standard using current best practices. As in other states, for example, a higher residential share of taxes lowers inefficiency by motivating voters to monitor their school officials more carefully. In contrast, an increase in state aid leads to more inefficiency because it lowers voters' perceived need for this type of monitoring.

We use these models to determine whether the substantial increases in Chapter 70 aid and the changes in its distribution led to improved student performance, especially in high-need school districts. Note that increased state aid does not necessarily lead to higher student performance because it affects both the demand for education and the incentives of voters to monitor school officials. We account for both types of effects.

These models then allow us to predict student performance in 2006 using (1) state education aid per pupil in 1993 (the academic year just before MERA came into effect), (2) state aid per pupil in 1993 blown up to the 2006 Chapter 70 aid total, and (3) actual Chapter 70 aid per pupil in 2006. The first prediction indicates the student performance school districts would have achieved in 2006 if they had received the amount of state education aid in 1993. The second prediction indicates performance if the state had delivered the same amount of state aid as 2006 but with the 1993 distribution. The third predication shows the systematic impact on performance of the implemented reforms. A comparison of (1) and (2) shows the impact of the increase in the aid budget on student performance. A comparison of (2) and (3) shows the analogous impact from changes in the aid formula. Finally, a comparison of (1) and (3) indicates

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[2] See, for example, the use of these models in New York (T. H. Eom, W. Duncombe, P. Nguyen-Hoang, and J. Yinger, "The Unintended Consequences of Property Tax Relief: New York State's STAR Program," Forthcoming, *Education Finance and Policy*) or in California (W. Duncombe and J. Yinger, "Making Do: State Constraints and Local Responses in California's Education Finance System," *International Tax and Public Finance* 18 (3) (June 2011), pp. 337-368.

[3] Analogous results for New York and a few other states are, of course, discussed in previous columns.

the full impact of the MERA reforms.

We find that student performance, as measured by test scores, was boosted significantly both by the increase in the aid budget and by the formula revisions that shifted aid toward high-need districts. As shown in Table 1 below, these positive impacts could be seen in both high-need and low-need districts. (In this table, a school district's "need" is measured by its education cost index, which is a product of our cost model estimation.) In short, increases in state education aid can lead to higher student performance.

Nevertheless, this table also reveals how difficult it is to help the neediest districts: The greater the need, the lower the impact of the reforms on student performance. Despite the fact that revisions in the aid formula were designed to shift aid toward needier districts, for example, these revisions led to a higher rise in the average low-need district (6.8 points) than in the average high-need district (0.7 points). Even though MERA stimulated impressive student performance gains, therefore, it actually increased the performance gap between the highest- and lowest-need districts. More research is obviously needed to identify the state education aid formulas (and, of course, other policies) that do the best job of helping the neediest districts.

Table 1. The Impacts of MERA on Test Scores by Cost Index Decile

Districts by cost index deciles	**Mean test scores with actual 1993 state education aid per pupil**	**Mean test scores with boosted 1993 state education aid per pupil[a]**	**Mean test scores with actual Chapter 70 aid per pupil**	**Differences**	
	(1)	**(2)**	**(3)**	**(3) – (1)**	**(3) – (2)**
1-First (lowest)	80.72	81.57	88.33	7.61	6.77
2-Second	79.52	80.46	87.07	7.55	6.62
3-Third	78.43	79.33	86.00	7.57	6.67
4-Fourth	77.80	78.74	85.37	7.56	6.63
5-Fifth	76.65	78.20	83.87	7.22	5.67
6-Sixth	75.49	76.73	82.73	7.24	6.00
7-Seventh	74.82	77.02	81.82	7.00	4.80
8-Eighth	72.39	74.21	79.29	6.90	5.07
9-Ninth	71.86	74.14	78.74	6.88	4.60
10-Tenth (highest)	64.86	68.87	69.60	4.75	0.73
Difference between highest and lowest deciles (in percentage points)	**15.87**	**12.69**	**18.73**		

Source: Table 6 in Nguyen-Hoang and Yinger (2014).